"thiolcarboxylic acid." On the other hand, where W is alkyl, the above formula represents a "ketone" group. Where W is hydrogen, the above formula represents an "aldehyde" group.

[0656] As used herein, the term "heteroaromatic" or "heteroaryl" means a monocyclic or polycyclic heteroaromatic ring (or radical thereof) comprising carbon atom ring members and one or more heteroatom ring members (such as, for example, oxygen, sulfur or nitrogen). Typically, the heteroaromatic ring has from 5 to about 14 ring members in which at least 1 ring member is a heteroatom selected from oxygen, sulfur, and nitrogen. In another embodiment, the heteroaromatic ring is a 5 or 6 membered ring and may contain from 1 to about 4 heteroatoms. In another embodiment, the heteroaromatic ring system has a 7 to 14 ring members and may contain from 1 to about 7 heteroatoms. Representative heteroaryls include pyridyl, furyl, thienyl, pyrrolyl, oxazolyl, imidazolyl, indolizinyl, thiazolyl, isoxazolyl, pyrazolyl, isothiazolyl, pyridazinyl, pyrimidinyl, pyrazinyl, triazinyl, triazolyl, pyridinyl, thiadiazolyl, pyrazinyl, quinolyl, isoquinolyl, indazolyl, benzoxazolyl, benzofuryl, benzothiazolyl, indolizinyl, imidazopyridinyl, isothiazolyl, tetrazolyl, benzimidazolyl, benzoxazolyl, benzothiazolyl, benzothiadiazolyl, benzoxadiazolyl, carbazolyl, indolyl, tetrahydroindolyl, azaindolyl, imidazopyridyl, qunizaolinyl, purinyl, pyrrolo[2,3]pyrimidyl, pyrazolo[3,4]pyrimidyl, benzo(b)thienyl, and the like. These heteroaryl groups may be optionally substituted with one or more substituents.

[0657] The term "substituted" is contemplated to include all permissible substituents of organic compounds, "permissible" being in the context of the chemical rules of valence known to those of ordinary skill in the art. In some cases, "substituted" may generally refer to replacement of a hydrogen with a substituent as described herein. However, "substituted," as used herein, does not encompass replacement and/or alteration of a key functional group by which a molecule is identified, e.g., such that the "substituted" functional group becomes, through substitution, a different functional group. For example, a "substituted phenyl" must still comprise the phenyl moiety and cannot be modified by substitution, in this definition, to become, e.g., a heteroaryl group such as pyridine. In a broad aspect, the permissible substituents include acyclic and cyclic, branched and unbranched, carbocyclic and heterocyclic, aromatic and nonaromatic substituents of organic compounds. Illustrative substituents include, for example, those described herein. The permissible substituents can be one or more and the same or different for appropriate organic compounds. For purposes of this disclosure, the heteroatoms such as nitrogen may have hydrogen substituents and/or any permissible substituents of organic compounds described herein which satisfy the valencies of the heteroatoms. This disclosure is not intended to be limited in any manner by the permissible substituents of organic compounds.

[0658] Examples of substituents include, but are not limited to, alkyl, aryl, aralkyl, cyclic alkyl, heterocycloalkyl, hydroxy, alkoxy, aryloxy, perhaloalkoxy, aralkoxy, heteroaryl, heteroaryloxy, heteroarylalkyl, heteroaralkoxy, azido, amino, halogen, alkylthio, oxo, acyl, acylalkyl, carboxy esters, carboxyl, carboxamido, nitro, acyloxy, aminoalkyl, alkylaminoaryl, alkylaryl, alkylaminoalkyl, alkoxyaryl, arylamino, aralkylamino, alkylsulfonyl, carboxamidoalkylaryl, carboxamidoaryl, hydroxyalkyl, haloalkyl, alkylaminoalkylcarboxy, aminocarboxamidoalkyl, alkoxyalkyl, perhaloalkyl, arylalkyloxyalkyl, and the like.

1. A method for identifying a change in an emissive species over a period of time, comprising:

exciting the species such that it produces a detectable non-steady-state emission during an emission time period of the emissive species, wherein the emission time period is at least 10 nanoseconds;

obtaining, using an image sensor, data associated with the detectable non-steady state emission;

create, based on at least a portion of the data obtained using the image sensor, a single image, wherein a first set of data used to create a first portion of the single image corresponds to a first portion of the emission time period, and wherein a second set of data used to create a second portion of the single image corresponds to a second portion of the emission time period; and

determining, based upon a difference between the first portion and the second portion of the single image, the change in the emissive species.

2. A method for identifying a change in an emissive species over a period of time, comprising:

causing the species to emit non-steady-state electromagnetic radiation during an emission time period of the emissive species;

obtaining, using an image sensor, a single image of at least a portion of the electromagnetic radiation emitted by the emissive species;

identifying information from a first image portion corresponding to emission of electromagnetic radiation by the emissive species at least at a first point in time;

identifying information from a second image portion corresponding to emission of electromagnetic radiation by the emissive species at least at a second point in time; and

determining, from at least the information from the first image portion and the information from the second image portion, the change in the emissive species.

3. A method as in any preceding claim, comprising:

identifying information from more than two image portions of the single image corresponding to emission of electromagnetic radiation by the emissive species at more than two points in time, and/or obtaining a plurality of images, each image being of at least a portion of the electromagnetic radiation emitted by the emissive species, and for each image identifying information from a first image portion corresponding to emission of electromagnetic radiation by the emissive species at least at a first point in time, and identifying information from a second image portion corresponding to emission of electromagnetic radiation by the emissive species at least at a second point in time; and from information identified from the more than two image portions, and/or from information from the plurality of images, determining a change in the emissive species.

4. A method as in claim **1**, wherein the emissive species produces a detectable steady-state emission.

5. A method as in claim **1**, comprising a second emissive species, different than the emissive species, wherein the second emissive species produces a detectable steady-state emission under a set of conditions.